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Forest Insect Conditions in the Southeast During 1957

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U. S. DEPARTMENT OF AGRICULTURE

by

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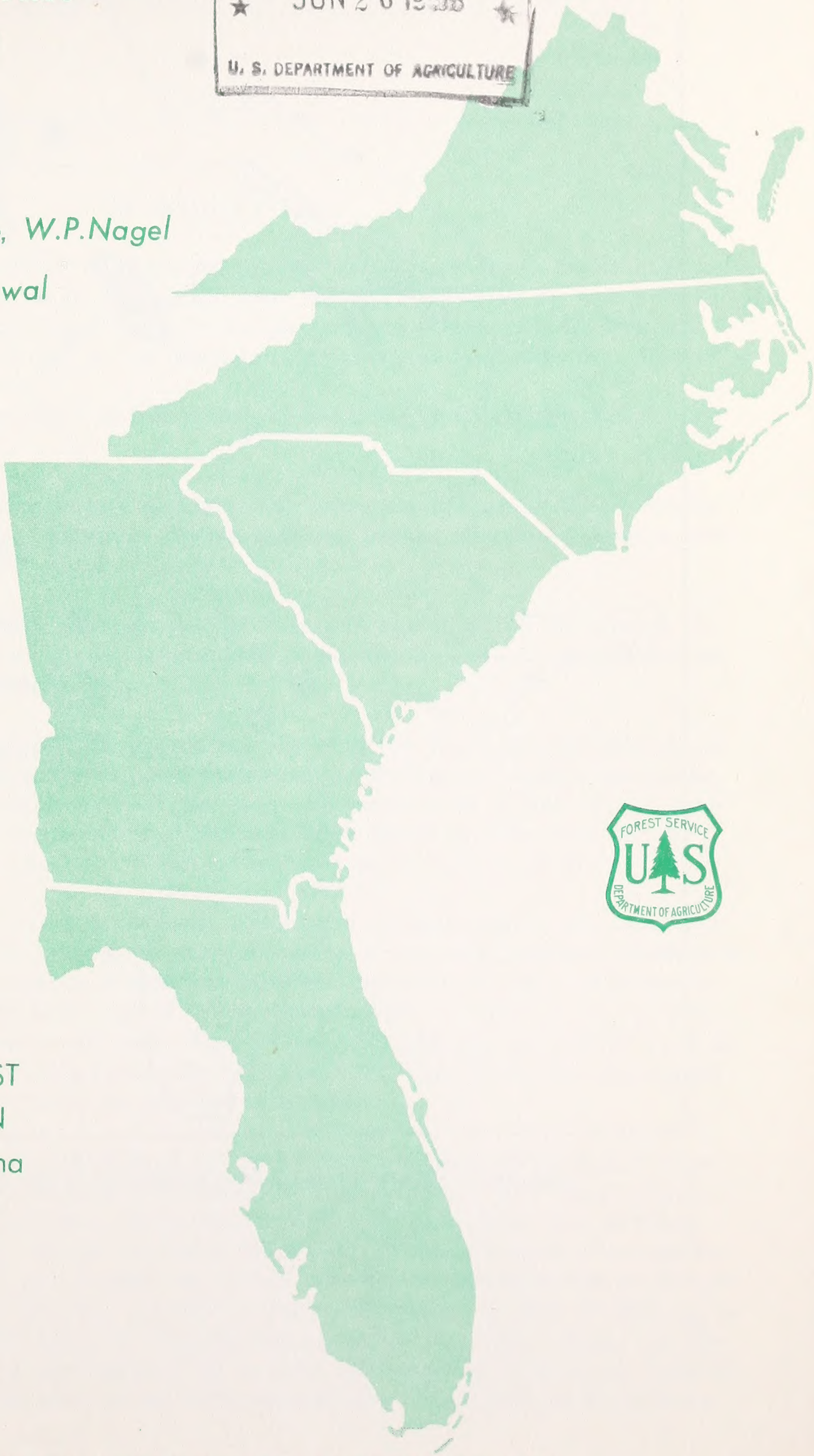

SOUTHEASTERN FOREST
EXPERIMENT STATION
Asheville, North Carolina

Joseph F. Pechanec,
Director

U. S. DEPARTMENT OF AGRICULTURE - FOREST SERVICE

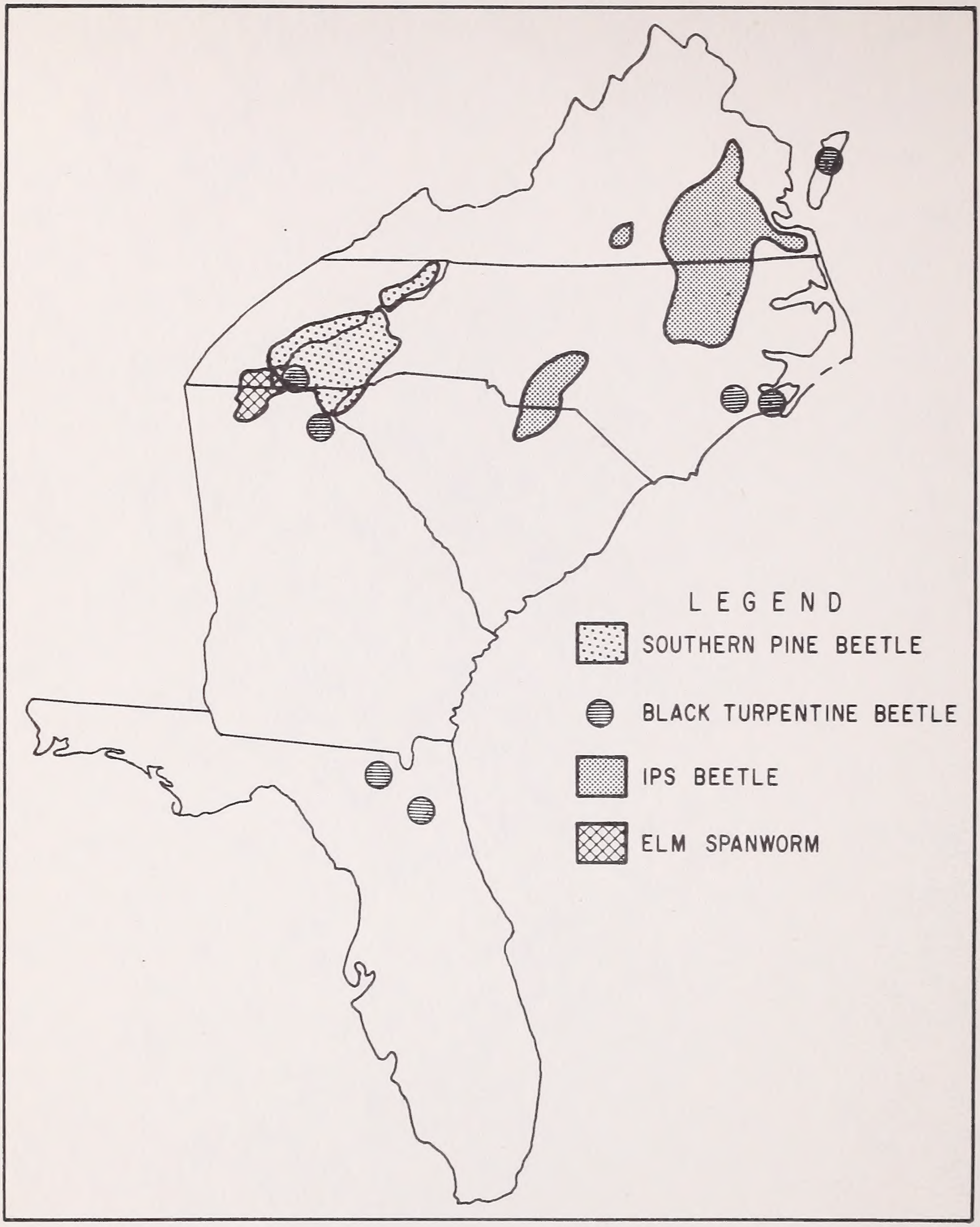

Figure 1.--Major forest insect epidemics in the Southeast in 1957.

FOREST INSECT CONDITIONS IN THE SOUTHEAST DURING 1957

by

W. F. McCambridge, W. P. Nagel, and R. J. Kowal

INTRODUCTION

Forest insect conditions continued to improve generally in the Southeast during 1957 (fig. 1) despite the fact that Ips beetles killed an estimated 10 million board-feet during one epidemic period and southern pine beetles destroyed over 95,000 trees in the Southern Appalachian Mountains.

Extremely cold weather in December killed a high percentage of southern pine beetle broods.

The black turpentine beetle remained in outbreak status on the Hoffman Forest in eastern North Carolina. In Florida the beetle was much less active than in 1956.

The elm spanworm (snow-white linden moth) was the only defoliator in outbreak status, although local infestations of sawflies, especially in Florida, were causing some concern.

During 1957 a cooperative insect survey plan for Florida was developed and two semi-annual aerial surveys conducted. These surveys were under the direction of the Florida Forest Service, with the State Plant Board and U. S. Forest Service cooperating. During these surveys over ten million acres of forest land in northern Florida were covered by 2.5-percent intensity.

The summary of insect conditions presented in this report includes only those infestations which caused, or were capable of causing, serious economic losses. A few minor insects of special interest are also noted. This report is made up to a considerable extent from information submitted directly to this office by cooperators and from reports and information submitted by pest control foresters, especially from Virginia and North Carolina. The summary of formal cooperative reports is presented in table 1.

While the number of reports received by this Station in 1957 is less than those submitted in 1956, insect conditions during the year were under much greater scrutiny. In Virginia, field reports from each district are summarized monthly by the insect and disease specialist in the Division of Forestry. Copies of these reports are submitted to this office. In addition, the associate extension entomologist puts out a monthly economic insect report containing a section devoted to forest insects. A somewhat similar but less formal system exists in North Carolina, and this office is kept informed of all serious infestations by frequent written and verbal communication. The State of Florida is rapidly developing an extensive reporting system and this year has developed an intensive aerial sampling survey for the detection of insect infestations and for an appraisal of insect losses.

Table 1.--Cooperative insect conditions reports received from federal, state, and private sources during 1957

State	Reports	State	Reports
	Number		Number
Virginia	2	Georgia	1
North Carolina	16	Florida	3
South Carolina	4	Tennessee (eastern)	2
		Total	30

SOUTHERN PINE BEETLE

Southern pine beetle activity in the Southeast was mainly confined to the epidemic areas in the Southern Appalachian Mountains. Light to moderate attacks occurred on the South Carolina coast and in central and eastern Virginia.

The epidemic situation in the Southern Appalachians entered into its fifth consecutive year during 1957. This epidemic is centered in an 8,000-square-mile-area of western North Carolina, eastern Tennessee, northeastern Georgia, and northwestern South Carolina. It is estimated that approximately 95,000 trees containing an estimated 2-1/3 million board-feet of pine were killed by the beetle in this area. Survey estimates prior to August were based upon aerial operational surveys of the infested areas conducted by Experiment Station and control unit personnel. In August the Regional Office assumed the responsibility for these operational flights. Loss estimates since August were derived from survey reports and treating records.

Table 2 summarizes the infestation and treating records for 1957.

Though figure 2 shows an increase in the number of infested trees for 1957 over that of 1956, this is not actually a true picture. Infestation estimates for 1956 were based mainly upon information obtained from aerial surveys over control units and included few estimates of attacks on other areas of beetle activity. The estimate for 1957 is a more realistic figure in that it includes estimates in certain areas outside of control units. Such areas are chiefly in the Great Smoky Mountains National Park, where tremendous losses occurred. In reality, attacks by the southern pine beetle were not as severe or as numerous in 1957 on most control areas.

Table 2.--Southern pine beetle losses and control accomplishments during 1957 in the Southern Appalachian Mountains

Area	Trees infested	Trees treated	Volume killed [1]
	Number	Number	Thousand board-feet
Georgia			
Brasstown District	135		
Tallulah District	7,725	3,000	
Total	7,860	3,000	197
North Carolina			
Catawba District	450	19	
Cheoah District	4,605	5,877	
French Broad District	75	64	
Grandfather District	227	94	
Pisgah District	900	556	
Tusquitee District	2,835	3,102	
Asheville Basin	1,760	3,856	
Cherokee County		2,663	
Blue Ridge Parkway		124	
Cherokee Indian Reservation		155	
Total	10,852	16,510	271
South Carolina			
General Pickens District	6,083	3,110	
Total	6,083	3,110	152
Tennessee			
Hiwassee District	160		
Tellico District	6,239	5,914	
Unaka District	500		
Watauga District	500		
Great Smoky Mountains National Park	62,950	4,669	
Total	70,349	10,583	1,759
Grand Total	95,144	33,203	2,379

[1] Volume of each killed tree estimated to be 25 board-feet.

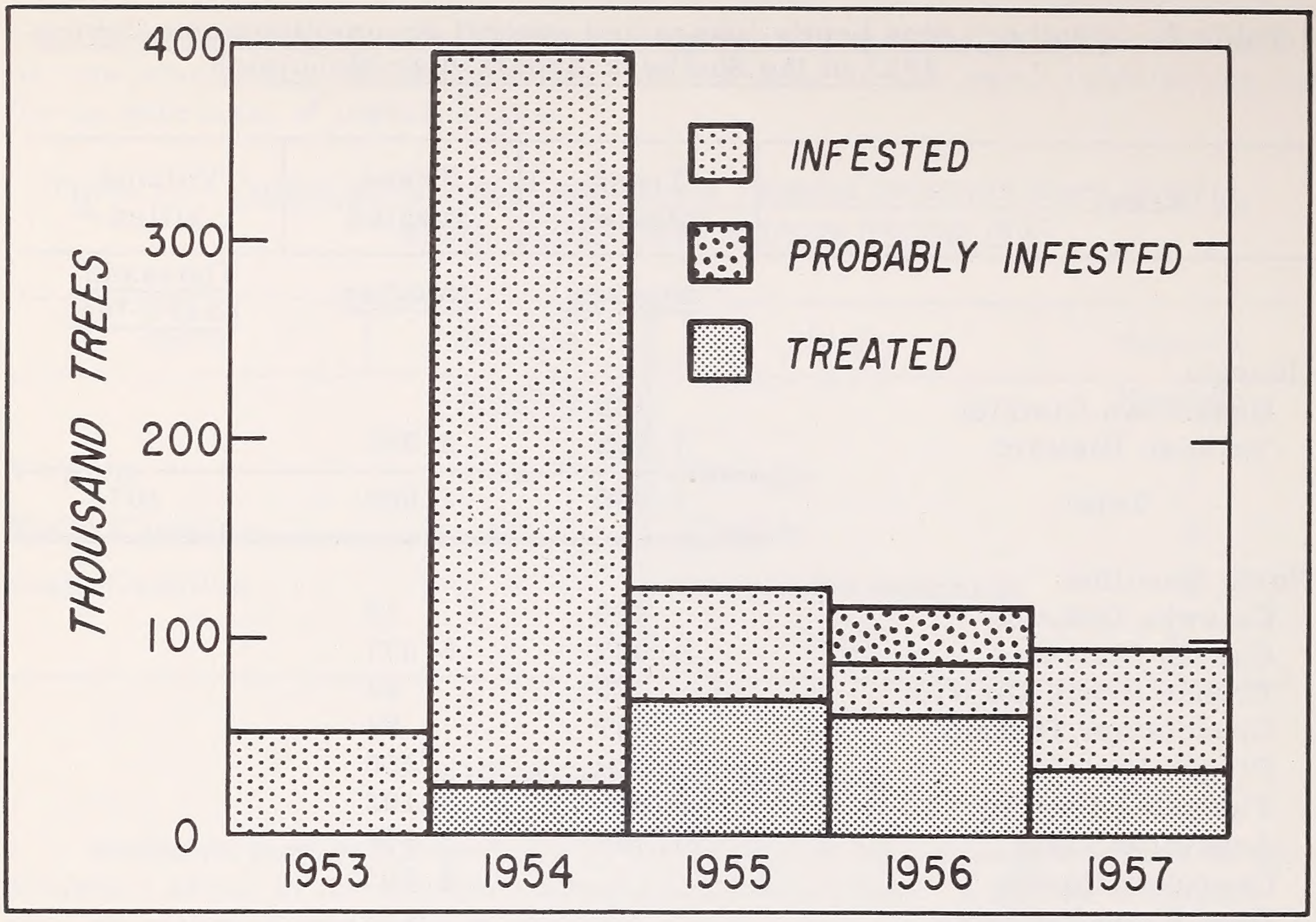

Figure 2.--Southern pine beetle epidemic within control units in the Southern Appalachian Mountains, 1953-1957. Survey estimates as compared with control accomplishments.

Direct control action was also less than in the preceding year and was at times discontinued because of scarcity of infested trees and some delays in obtaining control funds. Little salvage was accomplished by any of the control units. Unfortunately, data on the number or volumes of killed trees that were salvaged are not available. Two units, the Tellico District in Tennessee and the Tusquitee District in North Carolina, utilized burning as a control measure under restrictive conditions and in both cases it proved to be very effective and economical. This form of control is not generally recommended. Most direct control action was with a spray of 0.25 percent gamma benzene hexachloride and fuel oil applied to the bark surfaces of the infested trees. A total of 33,203 infested trees were either felled and sprayed or burned during 1957.

On December 12, 1958, during a winter which was colder than normal, temperatures fell to 0° F. and below in many locations throughout the outbreak area. This extreme cold lasted for only one day but temperatures remained well below freezing for several days.

Bark samples containing beetle broods show much variation in mortality because of stage and size of the insect and its location in the bark. Results of samples taken to date are presented in table 3. Sampling is continuing at other locations.

Table 3.--Mortality of southern pine beetle brood in the Southern Appalachian Mountains caused by low temperatures of December 12, 1957

Sample location	Minimum temperature	Mortality, all stages
	Degrees F.	Percent
General Pickens District, South Carolina	+2	41
Tusquitee District, North Carolina	-2	78
Tellico District, Tennessee	-5	72
Bent Creek, North Carolina	0	73
Asheville Basin, North Carolina	1	83

Larvae of a predator (probably Thanasimus dubius) of the family Cleridae, which is predaceous upon the southern pine beetle, survived the cold much better than did the beetle. Mortalities were about 40 percent of those sustained by the southern pine beetle.

It is hoped that woodpeckers and the clerids working on these reduced beetle populations will bring the beetles to endemic levels in some areas.

Virginia.--During 1957 there were scattered reports of small infestation centers in south-central and eastern Virginia. Groups of 3 to 5 trees were common, with an occasional infested spot running up to 60 trees. Ips beetles were frequently associated with these southern pine beetle attacks.

North Carolina.--Control activities were intermittent during the first 6 months of the year and by mid-May all operations were halted. At that time crews were unable to find trees containing living broods, and newly attacked trees had not become evident. Fading trees were first noticed in early June, at which time surveys and control operations were reactivated.

Infestations on the Catawba, French Broad, and Grandfather Districts were few and scattered in 1957. Chemical control was applied to 714 trees on these Districts. Activity on the Pisgah District was continuous but not extensive, and of the 900 trees infested 556 were sprayed. As in 1956, the highest incidence of attacks took place on the Cheoah and Tusquitee Districts. However, losses were not so great during 1957. Survey estimates place the number of attacked trees at 7,900 for these two Districts this year, compared to 19,020 in 1956. Control action was greater on the Cheoah District mainly because of the heavily infested Slickrock drainage, which had previously been inaccessible. The Tusquitee and Cheoah Districts treated 8,979 pines in 1957 as compared to 7,440 in 1956.

Approximately 10,850 pines containing 271,000 board-feet of timber were killed by the beetle in North Carolina during 1957. A total of 16,202 trees were sprayed, 6,500 of which were treated on private lands by the State of North

Carolina. Many of these trees were attacked in 1956 and not treated until 1957. During December, one district burned 180 infested trees under favorable conditions and found that such a procedure resulted in excellent control. This burning was done after a snowfall, with the potential fire hazard all but eliminated.

South Carolina.--The majority of southern pine beetle activity took place on the General Pickens District in the northwestern corner of the State. Mortality on the District in 1957 was about 6,000 trees (152,000 board-feet), compared to 8,000 trees during 1956. Some 3,110 trees were treated in 1957, whereas 7,382 had been treated in the preceding year. Many areas remained untreated at the end of 1957.

A small number of trees were attacked by the beetle in association with Ips spp. in forest stands immediately south of Georgetown. These attacks were insignificant and further activity has not been noted.

Georgia.--Beetle activity remained fairly constant throughout the year on the Tallulah District in northeastern Georgia. It was estimated that 7,700 trees containing 197,000 board-feet of timber were killed in 1957. Chemical control was used against approximately 3,000 infested trees during the year. The only other known area that had southern pine beetle attacks was detected on the Brasstown District in northern Georgia during November. About 135 infested trees were found on an aerial survey, but a subsequent ground examination revealed that few successful broods had been produced and no attacks in adjacent green timber were evident.

Tennessee.--The most active areas of the epidemic were in eastern Tennessee. Two units, the Tellico District and the Great Smoky Mountains National Park, were the only ones on which control action took place. A few attacks were observed on the Hiwassee District in the spring, but a subsequent survey showed no further spread from these trees. Light, scattered infestations were noted on the Watauga, Unaka, and Nolichucky Districts in the spring, and subsequent surveys have not been made. It is estimated that about 1,500 trees were killed on these Districts in 1957. Low timber values make control and intensive surveys on these Districts impractical.

About 6,200 trees (155,000 board-feet) were estimated to have been killed on the Tellico District in 1957. Direct control operations were carried out against 5,914, and at the end of the year several areas were in need of treatment. Control by spraying was supplemented in part by burning. Such procedure proved to be both entomologically sound as a control method and profitable to the District. Burning costs were about $0.52 per tree, whereas spraying costs were $1.19 per tree.

While the Great Smoky Mountains National Park lies in both Tennessee and North Carolina, the greater majority of attacks and control took place in Tennessee. Losses on the control units within the Park were estimated to have been 13,000 trees. In addition, it is thought that uncontrolled areas in the Park suffered a total kill of at least 50,000 pines. Infestations in these uncontrolled areas were extremely active and numerous throughout the year. All of these additional 50,000 trees were not in Tennessee, but it is assumed that less than 10 percent occurred on the North Carolina portion of the Park.

Treating records of the Park show that 4,669 trees were sprayed during the calendar year on the control units. Lack of sufficient funds at critical periods prevented the Park from employing a more vigorous control program. At the end of the year many active spots still were in need of chemical treatment.

The large and aggressive beetle populations in the Great Smoky Mountains National Park are difficult to account for. It is known from long-standing records that southern pine beetles can be found in the western part of the Park when they are almost impossible to detect elsewhere. The area seems to be a permanent breeding ground for the beetle. It may be that vigorous strains of the beetle exist, which, in the presence of large areas of inaccessible host material, perpetuate beetle populations. These gradually reinfest nearby control units (even though the distance between untreated infestations and control units appear great enough to minimize migration). This, combined with difficulties in applying control measures, may explain why it has not been possible to keep the beetles down to a low population level.

PINE ENGRAVER BEETLE

A short-lived but very destructive outbreak of Ips beetles occurred during June, July, and August in the east-central portions of Virginia and North Carolina and in northeastern South Carolina. The outbreak was shorter in duration in some areas than in others and was scattered broadly over the region, as outlined in figure 1.

The outbreaks began in early June in the southern portion of the infestation area, developing a little later and continuing a little longer in the northern extremities.

Throughout the infestation area in North Carolina ground examinations have shown that after one initial and tremendous increase in beetle populations, adverse factors brought a sudden halt to the outbreak. Examination of the initial groups of killed trees showed: (a) broods were frequently not produced by parent beetles of the initial population buildup, (b) broods often failed to develop beyond the small larval stage, and (c) adult beetles that did develop failed to emerge.

During the short period that Ips were in outbreak status in east central Virginia and North Carolina and northeastern South Carolina, it is estimated that about 10 million board-feet of pine, chiefly loblolly, were killed.

All three species of Ips were present in these outbreak areas; namely, Ips calligraphus, Ips grandicollis, and Ips avulsus.

In Florida, during the fall survey Ips kills were frequently found associated with lightning-struck trees. These infestations died out shortly after the initial population buildup.

BLACK TURPENTINE BEETLE

Turpentine beetle control came to a standstill on the Osceola National Forest in Florida during the year. Less beetle activity was noted in other parts of north Florida and south Georgia. Scattered reports of light damage were received from other parts of the Southeast. In the naval stores program, measures for control of the beetle continued. A survey of operations in north Florida and south Georgia revealed that wherever control measures were being applied as recommended little tree mortality occurred.

In North Carolina a small but vigorous outbreak in the southwestern part of the State required chemical treatment and was quickly brought under control. Elsewhere in the State a full scale outbreak continues on the Hoffman Forest in the vicinity of New Bern. Continuous logging of pond pine in pocosin type has maintained high but fluctuating beetle populations. Early in the year turpentine beetles were declining. Populations remained low until midsummer. Since then they have increased, and in some logging units most of the residual trees have been killed. In contrast, uncut stands across the road were unattacked. It remains to be seen how these uncut stands will fare when there is no suitable material in the cutover areas.

In northern Georgia, the turpentine beetle has maintained high populations in stumps, with some standing trees coming under attack. Damaged trees along skidways and logging roads have suffered some mortality. During 1957, chemical control was required to treat 1,784 standing trees and 5,806 stumps.

Reports from Virginia indicated light but widespread turpentine beetle activity from time to time during 1957. No large outbreaks developed, however.

VARIABLE OAK LEAF CATERPILLAR

In 1956 this insect was in outbreak status over millions of acres in eastern Virginia. During the winter of 1956-57, prepupae were abundant in the soil. As late as June, prepupae were still abundant. For reasons not wholly known, emergence failed to take place. This condition has been characteristic of the insect in other areas of the South in the past years. During 1957, the variable oak leaf caterpillar was reported from only one small area in Warwick County.

ELM SPANWORM

(Snow-white Linden Moth)

The elm spanworm, Ennomos subsignarius, caused severe defoliation of hardwoods, mainly hickory and oak, again during 1957. In 1956 it was estimated that 50,000 acres in northern Georgia had been defoliated. During 1957 this epidemic center has increased to 100,000 acres, with an additional 200,000 acres of defoliation extending into southeastern Tennessee and southwestern North Carolina. Heaviest defoliation occurred mainly along the ridgetops. As yet no tree mortality has been attributed directly to the looper. Studies to determine whether any growth loss had occurred were undertaken; incomplete results indicate that some growth loss is taking place.

FIR APHID

Chermes piceae has been detected infesting Frazer fir on Mt. Mitchell. The infestation is believed of fairly recent origin and is under surveillance.

PINE SAWFLIES

Sawfly activity along the eastern shore of Virginia was negligible during 1957. This was a welcome relief, for the sawfly had been active in these areas for the past 4 years.

Elsewhere in Virginia, there were frequent reports of small active infestations, with a possible epidemic developing in the south central and southeastern sections of the State.

In South Carolina a sawfly, Neodiprion taedae linearis, was epidemic in scattered infestations of 1 to 10 acres near Union. A severe hailstorm in April when larvae were active is believed to be at least partly responsible for control of this sawfly.

In north Florida, sawfly activity increased during the year. In the fall of 1957, Neodiprion exitans (tentative identification) has been reported in five counties in north central Florida. Infestations are small and scattered with 2 to 10 trees being heavily defoliated in many groups. Loblolly pine is suffering greatest damage. (About 10 years ago this species contributed to mortality of loblolly pine in Alabama as a result of its fall feeding habit.)

A PINE LEAF CHAFER

Pachystethus oblivia was epidemic in a young plantation in eastern North Carolina in May and June 1957. This beetle was recorded in 1956 near Waycross, Georgia, and may occur frequently enough to merit some mention.

These beetles, the male of which resembles a Japanese beetle, cause damage which appears alarming in May and June. They bite a small notch near the base of needles, causing the outer sections to turn brown and droop. The great number of beetles and the flagged branches suggest a much more serious problem than that which usually develops. By midsummer the green needles have grown out, the dead terminal sections fallen off, and the seedlings or saplings look quite healthy.

PINE REPRODUCTION WEEVILS

Damage by the pales weevil, Hylobius pales, and the pitch eating weevil, Pachylobius picivorus, to young pine planted in clear-cut pine stands continued to be a cause of concern to foresters in the Southeast. However, to reduce such damage, many agencies are now dipping their seedlings in a water emulsion of 2 percent aldrin before planting.

PINE TIP MOTHS

Infestations by the Nantucket pine moth, Rhyacionia frustrana, continued at a high level throughout most of the Southeast. While they are most common on poor sites, damage on good sites has not been unusual. Little or no effort has been made to control the insect in large plantations, because no practical method has yet been developed. However, in small and valuable plantings such as seed orchards, the application of control measures is becoming increasingly common. Monthly spray applications of insecticides are usually applied during spring and summer. DDT is effective, though there is danger of a mite buildup. A water emulsion spray of 0.5 percent gamma BHC plus 2 percent malathion has been found most satisfactory for control of the tip moth and associated insects such as scales and aphids.

Infestations by another tip moth, Rhyacionia rigidana, while not nearly so common as the above, have been more prevalent than in other years. This insect appears to be confined to slash pine and attacks all ages of trees from the young seedling to large trees.

PINE PITCH MOTHS

In the spring of this year there was an abnormally widespread infection of slash pine cones by Cronartium cone rust. During studies being conducted on cone insects it was found that rust-infected cones were heavily attacked by pitch moths (Dioryctria spp.).

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